

ABSTRACT OF THE DISCLOSURE

The present invention provides a system for imaging an object by irradiating it with low doses of radiation, such as x-ray, from a plurality of positions angularly distributed about the object, and analyzing the intensity of the radiation transmitted through the object. A system according to the invention can include a radiation source, a low noise detector, and an image processor. The radiation source emits radiation toward a target scene, containing an object to be imaged, from a plurality of angular positions. In one embodiment, the plurality of angular positions defines an arc about the target scene. In another embodiment, the radiation source moves in a series of steps of varying angular spacing along the arc to generate the multiple images of the scene. The detector is positioned to detect radiation transmitted through the scene and produces radiation transmission data representing the intensity of the radiation transmitted through the scene. The image processor receives the radiation transmission data from the detector and produces a three-dimensional image of the scene. In some embodiments of the invention, the resolution of the detector can be varied. In such embodiments, the system of the invention further includes a resolution controller that varies the spatial resolution of the detector in response to the angular position from which radiation is emitted toward the scene.

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